Winter 1-1-1990

Wetlands Board Bulletin Vol. V, No. 1

Virginia Institute of Marine Science

wetlands Program

Wetlands Board BULLETIN

Dr. Carl Hershner, Program Directer
Kirk J. Havens and Thomas A. Barnard, Editors

Winter 1990
Vol. V, No. 1

Waste Assimilation by Wetlands

Kirk J. Havens

Positioned at the interface between terrestrial lands and aquatic habitats, wetlands have always functioned as natural filters. Sediments adsorb and retain various contaminants or pollutants may become buried through the accretion process and prevented from dispersing into the water column (Valiela, Vince, and Teal, 1976). Kepone in the James River is a good example of this phenomenon. Nutrients are assimilated by marsh plants and stored as plant tissue and pulsed back into the system as the plants die and decompose. All powered by the sun's energy. So why not utilize this natural filtering function of marshes to treat human waste or other organic wastes?

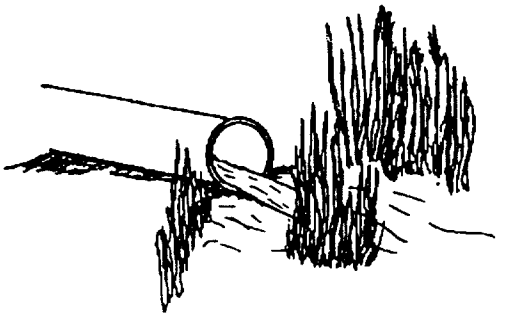
It is apparent that the direct application of nitrogen and phosphorus results in enhanced production. Studies have shown that additions of nutient-laden wastewater from menhaden fishery plants and sewage effluent from residential communities increased total plant biomass and annual net primary production (Marshall, 1970; Turner et al., 1976). However there is evidence that different marsh species respond differently to nutrient additions and not all marsh plants are physiologically capable of removing large amounts of nutrients (Steward and Ornes, 1975; Dolan et al., 1981).

A major concern with the utilization of marsh vegetation in waste treatment is that, along with nutrients, heavy metals such as lead, cadmium, zinc, and mercury are incorporated into the plant tissues (Valiela, Banus, and Teal, 1974). In a tidal system the heavy metals could be exported into the marine environment as the plant material decomposes and is flushed out. Studies have shown that some metals can be passed up the food web (Windom, 1976; Roman, 1981). Questions have also been raised concerning a marsh's ability to remove pathogenic microorganisms from sewage as it passes through the wetland (Bender and Correll, 1974).

Marshes actually serve as sources of nutrients when the vegetation decomposes. While wetland vegetation can absorb large quantities of nitrogen and phosphorous during the growing season, unless it is harvested much of it is released to the water when the plants die (Nichols, 1983). In addition, reduced temperatures during the winter months will result in a reduction in a wetlands ability to assimilate the wastewater (Nichols, 1983).

Channelization and water storage capacity also pose problems. As the wastewater flows through the marsh, channels form allowing a bypass of the wetland filtering function. Channelization coupled with tidal flushing results in a reduction in permanent nutrient storage (Kadlec and Kadlec, 1978). The water storage capacity of a wetland is important because the wastewater must be retained for a sufficient amount of time to allow the nutrient removal mechanisms to be effective (Hemond et al., 1984; Heliotis, 1989).

In addition, some studies suggest that marshes can quickly become overloaded and lose their ability to bind up nutrients (Bender and Correll, 1974; Kadlec, 1983). It then may take years for the marsh to regain a capacity for significant nutrient uptake. Bender and Correll (1974) suggest that at least 0.05 acres of marsh per person per year would be needed in a typical sewage release of 150 gallons per day per person. Nichols (1983) estimates 2.5 acres per 60



people is necessary to remove 50% of the nitrogen and phosphorous produced.

While the use of wetlands in wastewater treatment holds promise, specific questions such as overloading and the role of heavy metals and pathogenic microorganisms need more indepth research. At the present time wetlands should not be perceived as a panacea for sewage treatment, but used in concert with other treatment methodologies they may serve a valuable function.

Bender, M.E., and D.L. Correll. 1974. *The Use of Wetlands as Nutrient Removal Systems*. Chesapeake Research Consortium No. 29. VIMS Contrib. No. 624. Gloucester Point, Va. 12p.

Dolan, T.J., S.E. Bayley, J. Zoltek, and A.J. Hermann. 1981. Phosphorus dynamics of a Florida freshwater marsh receiving treated waste water. *J. Appl. Ecol.* 18(1): 205-219.

Heliotis, F.D. 1989. Water storage capacity of wetland used for wastewater treatment. *J. of Environ. Eng.-ASCE*, 115(4): pp. 822-834.

Hemond, H.F., W.K. Nuttle, R.W. Burke and K.D. Stoltzenback. 1984. Surface infiltration in salt marshes: Theory, measurement, and biogeochemical implications. *Water Resour. Res.*, 20(5): pp. 591-600.

Kadlec, R.H., and J.A. Kadlec. 1978. Wetlands and water quality, in *Wetland Functions and Values: The State of Our Understanding*. P.E. Greeson, J.R. Clark, and J.E. Clark, eds., American Water Resources Assoc., Minneapolis, Minn., pp. 436-456.

Kadlec, R.H. 1983. The Bellaire wetland: Wastewater alteration and recovery. *Wetlands* 3: pp. 44-63.

Marshall, D.E. 1970. Characteristics of *Spartina* marsh which is receiving treated municipal sewage wastes. In: *Studies of Marine Estuarine Ecosystems Developing with Treated Sewage Wastes*, H.T. Odum and A.F. Chestnut, eds., University of North Carolina Institute of Marine Sciences Annual Report 1969-1970, pp. 317-359.

Nichols, D.S. 1983. Capacity of natural wetlands to remove nutrients from wastewater. *J. Water Pollut. Control Fed.* 55: pp. 495-505.

Roman, C.T., W.A. Niering, and R.S. Warren. 1981. *Detrital Exchange Processes of a Delaware Salt Marsh*. Ph.D. dissertation, University of Delaware, 144p in *Conservation of Tidal Marshes*, Franklin C. Daiber, Van Nostrand Reinhold Co. Inc., publs., p132.

Steward, K.K., and W.H. Ornes. 1975. Assessing a marsh environment for waste water renovation. *Water Pollut. Control Fed. J.* 47(7): 1880-1891.

Turner, R.E., J.W. Day,Jr., M. Meo, P.M. Payonk, J.H. Stone, T.B. Ford, and W.G. Smith. 1976. Aspects of land-treated waste applications in Louisiana wetlands. In: *National Symposium on Freshwater Wetlands and Sewage Effluent Disposal Proceedings*, D.L. Tilton, R.H. Kadlec, and C.J. Richardson, eds., Ann Arbor, Mich., pp. 147-167 in *Conservation of Tidal Marshes*, Franklin C. Daiber, Van Nostrand Reinhold Co. Inc., publs., p123.

Valiela, I., M.D. Banus, and J.M. Teal. 1974. Response of salt marsh bivalves to enrichment with metal-containing sewage sludge and retention of lead, zinc and cadmium by marsh sediments. *Environ. Pollut.* 7:149-157.

Valiela, I., S. Vince, and J.M. Teal. 1976. Assimilation of sewage by wetlands. In: *Estuarine Processes*, vol. 1, M. Wiley, ed., Academic Press, New York, pp. 234-253.

Windom, H.L. 1976. *Geochemical Interactions of Heavy Metals in Southeastern Salt Marsh Environments*. Ecol. Res. Ser. EPA-600/376-023, Washington, D.C., 36p in *Conservation of Tidal Marshes*, Franklin C. Daiber, Van Nostrand Reinhold Co. Inc., publs., p129. ◆

A Note From The Virginia Marine Resources Commission

The Chesapeake Wetlands Board was presented the 1989 Water Conservationist of the Year award by the Virginia Wildlife Federation.

The 9th Annual Virginia Wetlands Management Symposium hosted by Hampton University and The Virginia Marine Resources Commission was held on February 24th at Hampton University. Approximately 130 people attended. Topics at the Symposium included:

- Nonvegetated Wetlands: Description and Values
- Wetlands Gains and Losses: Man's Activities
- Chesapeake Bay Preservation Act: Update
- Wetlands Restoration: Case Study
- Legislative Update: 1989 Amendments and 1990 Proposals
- Reapplication Waiting Period: Survey Results
- Open Forum: Discussion of items important to local Wetlands Boards

Editor's Note: A VIMS Wetland Program Technical Report concerning the first two agenda topics will be released next month.

Recent Court Decisions

Tabb Lakes, Ltd v. United States

The Fourth Circuit upheld the district court's decision that the Army Corps of Engineers lacked jurisdiction to require a Section 404 permit for the Tabb Lakes project. The court held that the memorandum issued by General Kelly of the Corps did not follow the Administrative Procedure Act's notice and comment procedures.

United States v. Pozsgai

The defendant underwent a jury trial after filling a 14 acre parcel of land in Pennsylvania. The filling occurred despite a temporary restraining order and a court order to cease and desist. The defendant was convicted of filling wetlands under Section 404 jurisdiction and was sentenced to three years in jail, ordered to pay a $202,000 fine, and ordered to restore the wetlands.

United States v. Mills

A Florida District Court fined two men $5,000 each and sentenced them to 21 months in prison without parole for filling a wetland and an unauthorized excavation of a canal on their property.

Another Perspective on Wetlands Management

Maryland's New Nontidal Wetlands Protection Act

David G. Burke, Chief
Nontidal Wetlands Division
Maryland Department of Natural Resources

Riding on the coattails of then Vice President Bush's pledge to achieve no net loss of wetlands and the National Wetland Policy Forum's recommendation to incorporate the no net loss goal into national legislation, last April, the Maryland General Assembly passed the first wetland act with an *explicit* no net loss goal. Although many federal agency offices and certain state wetland permitting programs have already been applying the no net loss standard, Maryland's Nontidal Wetlands Protection Act has recently been acclaimed as a model of state implementation of the nation's wetland protection goals.

Legislative History

Of those who were actively involved in the development of the state's program from its inception, many were mentally prepared for the legislation to go down in defeat. Legend had it that initial attempts in these matters should be viewed as "learning experiences," preparing one for a solid second year of legislative battles. Indeed, Maryland's neighbor to the south—Virginia—had fallen short in a similar attempt one year earlier, and nearby New Jersey struggled repeatedly before adopting a freshwater wetlands act.

Maryland's success, however, can be linked to three principal factors. First, during the previous gubernatorial administration, the Maryland Department of Natural Resources (DNR) initiated numerous educational efforts under the auspices of its Coastal Zone Management Program that established important groundwork. A strong training and education program directed at local governments and private consultants involved with land development was undertaken to spread the word about the values of nontidal wetlands, and the need for their protection. Many courses focused on the identification and classification of wetlands in the field; small group sessions viewed presentations regarding wetland functions, mapping, and management issues. In addition, the DNR completed a statewide wetlands database and Maryland's National Wetlands Inventory maps. Finally, *Non-tidal Wetlands Protection: A Handbook for Maryland Local Governments* (Environmental Law Institute and the Maryland Tidewater Administration 1983) was published and widely distributed to the general public.

Second, the 1987 campaign by the Chesapeake Bay states and the federal government to restore the Bay brought to light the importance of protecting Maryland's neglected nontidal wetland resources. Indeed, the historic 1987 Chesapeake Bay Agreement called for the development of a Bay-wide policy to protect both tidal and nontidal wetlands, and the final policy statement—adopted in January of 1989—established a goal of achieving a net resource gain in wetlands acreage and function over present conditions.

Third, and most important, the strong support of Governor William Donald Schaefer made the Nontidal Wetlands Protection Act a reality. Governor Schaefer instructed the Maryland Department of Natural Resources to assemble a task force to evaluate options for the protection of nontidal wetlands. After six months, a task force report was produced and became the basis for the Act. During the legislative session, however, the bill ran into stiff opposition. The countervailing forces were led by R. Clayton Mitchell Jr., the speaker of the House of Delegates and a representative of many rural constituents of Maryland's eastern shore who, while still adjusting to the affects of an earlier coastal critical areas law, were wary of governmental land use regulations. Responding to constituency pressures, Mitchell initially championed a drive to put the bill on an 18-month hold pending further study. Acting swiftly, the Governor set up a meeting for himself, Mitchell, and U. S. Environmental Protection Agency (EPA) Administrator William Reilly during which Reilly emphasized his preference for a state-backed initiative to protect nontidal wetlands over increased federal intervention and program dominance. Soon after the meeting, Mitchell dropped his opposition and the bill sailed through the General Assembly and onto the Governor's desk for final approval in May of 1989.

Legislative Intent

The Nontidal Wetlands Protection Act was designed to accomplish two primary objectives. First and foremost, it aimed to substantially reduce the increasing loss of nontidal wetlands. According to a study sponsored by the Fish and Wildlife Service examining losses from the mid-1950's to the late 1970's, Maryland has lost approximately 800 acres per year of its nearly 275,000 total acreage of nontidal wetlands. Although precise data is not available, other estimates suggest the loss is closer to 1,600 acres per

year, or even greater. Thus, it was clear that continued reliance upon the Federal Water Pollution Control Act's (FWPCA) 404 program to reduce losses would not work. Instead, Maryland had to plug the jurisdictional gaps of 404 and establish firm mitigation requirements consistent with a no net loss goal in order to stem the state's loss of nontidal wetlands.

Second, the Act was needed to expedite and coordinate the 404 permitting process. The development industry and others had vehemently complained that the permitting process was intolerably slow, unpredictable, and costing them millions of dollars in delays. Therefore, the Act directs the state to establish prompt, cost effective protection procedures that "avoid unnecessary delay and paperwork and provide clear guidance to the regulated community..." Explicit time constraints are specified throughout the Act, limiting the number of days the DNR may take to determine whether the application and wetland delineation are correct and to render a permit decision.

Speedy processing of nontidal wetland permits at the state level is anticipated to expedite federal 404 permit approvals. Although no provisions currently exist for joint federal/state permit processing, the DNR is required to develop a joint permit application that can be used to apply for a FWPCA 404 or River and Harbors Act 10 federal permit, or a state tidal, nontidal, or waterway construction permit. Furthermore, Maryland expects the Corps to issue statewide programmatic general permits that would obviate the need for federal permitting when a state permit has been issued. To a large degree, the state's efforts to expedite and coordinate the 404 permitting process, however, will depend upon the cooperation and support of the federal agencies that, under the auspices of the Bay Agreement, are expected to implement innovative procedures to help make the law work.

Key State Wetland Management Issues

While legislative details vary from state to state, there are key wetland management issues that all state wetland protection statutes must address. Maryland's approach to these myriad decisions represent one state's perspective on how nontidal wetlands protection legislation can best be written.

No Net Loss. The Act incorporates the nation's no net loss goal by stating that "the goal of the program shall be to attain no net overall loss in nontidal wetland acreage and function and to strive for a net resource gain in nontidal wetlands over present conditions". It provides broad authority to the DNR to work toward this goal through strict permitting and mitigation requirements, comprehensive watershed planning, and a Nontidal Wetlands Compensation Fund dedicated to the creation, restoration, and enhancement of nontidal wetlands.

The DNR does not, however, expect to attain the no net loss goal solely through this piece of legislation. The Chesapeake Bay Wetlands Policy collectively obligates its federal and state signatories to establish—independent of regulatory initiatives—private sector incentive and land acquisition programs for wetlands creation, rehabilitation, and restoration. The standards for measuring the progress made toward attaining this goal will be developed later in the state's continuing regulatory process.

Definition, delineation, and ranking. The Act defines wetlands according to the regulatory definition used by EPA and the Corps for administering the 404 permit program (with only a slight variation). It excludes, however, nontidal wetlands within the state's coastal critical area. These areas are already regulated and represent a small percentage of the state's nontidal wetlands. The Act also requires that all wetland determinations be made in accordance with the new *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*. Furthermore, the DNR must prepare, and periodically revise, nonregulatory guidance maps indicating the location of the state's nontidal wetlands. Although no specific scale is required, initial maps will be prepared by December of 1989 at a scale of 1" = 2000'. The preparation of more detailed maps is planned for the future. Finally, the Act contains no provisions for increasing regulatory protection measures based on a hierachy of wetland classes or types.

Regulated areas and exemptions. The Act regulates virtually any activity in a nontidal wetland or within its 25-foot buffer that could impact the area. Such activities include removing vegetation, excavating, filling, grading, draining, placing obstructions, or changing surface or ground water. Buffers are defined by the Act as 25 feet and treated just as stringently as the wetland itself. By regulation, the DNR is permitted to designate those areas that merit buffers up to 100 feet, such as wetlands adjacent to steep slopes, highly erodible soils, soils with development constraints, or nontidal wetlands of special state concern.

Permits are not needed, however, for isolated wetlands less than one acre in size that contain no significant plant or wildlife value. Agricultural and forestry activities are also exempted, but are controlled through best management practices designed to protect wetlands. Best management practices are

mandated in wetland areas and must be approved by local Soil Conservation Districts.

Furthermore, the DNR may not issue a permit unless it finds, among other things, that the regulated activity is either water-dependent and requires access to a nontidal wetland or is not water-dependent but has no practicable alternative. Applicants must demonstrate that the activity will minimize alteration or impairment, and will not cause—or contribute to—the degradation of groundwaters or surface waters.

Mitigation and Compensation. Although degradation and losses are to be offset wherever practicable and feasible, mitigation must be provided for any losses of nontidal wetlands not exempted from permitting. Mitigation for losses due to agricultural activities is required, except for statutory exemptions, and unless the State Department of Agriculture determines that mitigation would cause an economic hardship and so threaten the continued operation of the farm. If such a hardship is found, mitigation can be deferred only until the hardship no longer exists, a transfer to a new owner or operator occurs, or agricultural activities no longer take place. Although no replacement mitigation is required for forestry operations, all such operations must be controlled through best management practices that prohibit wetland conversions.

In addition, the Act establishes a compensation fund for the purpose of creating, restoring, or enhancing nontidal wetlands. The DNR may accept monetary compensation only if creation, restoration, and enhancement are not feasible. Sequenced mitigation actions are mandated, and monetary compensation cannot substitute for requirements to first avoid and minimize wetland impacts.

Area-wide planning. In cooperation with other state, local, and federal agencies, the DNR may prepare comprehensive watershed management plans that address wetland protection, mitigation activities, cumulative impacts, flood protection, and water supply concerns. Once a plan is developed, permits for regulated activities cannot be issued unless they are consistent with the plan. Thus, completed plans become the basis for consistent permitting and mitigation decisions.

Local Governments. The Act permits the DNR to delegate all or part of its authority to counties that enact a comparable program meeting mininmum state standards. Program delegation expires in two years, however, unless it is renewed by the DNR. Importantly, the DNR may withdraw program delegation if local programs are not administered in a manner consistent with state regulatory standards.

Enforcement. Both the DNR and any county with program delegation authority are empowered with enforcement authority. Stop- work orders for permitted activities, permit revocation, and misdemeanor fines of up to $25,000 are the principal enforcement measures available.

Assumption of 404. Finally, the Act is *not* designed to assume the FWPCA 404 program. To be eligible for 404 assumption, substantial changes involving agricultural and forestry activities would be required. In addition, the Act's jurisdiction is confined to nontidal wetlands, rather than all waters of the United States. The Act does, however, mandate the DNR to evaluate the feasibility of assuming the 404 program.

Looking Ahead

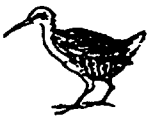
The DNR must adopt final regulations for administering the Act by December 31, 1989, after which point the 1990 Maryland General Assembly may make changes. Effective January 1, 1991, the DNR and authorized counties will begin issuing permits. In the interim, nontidal wetlands will benefit from protection standards designed to avoid and minimize impacts in the 100-year floodplain under the jurisdiction of the DNR's waterway permit program. And in 1991, Maryland will begin its ascent toward the attainment of a "no net overall loss and...a net resource gain in nontidal wetlands..." *Reprinted with permission from the National Wetlands Newsletter. The National Wetlands Newsletter is published by the Environmental Law Institute, 1616 P Street NW, Washington, DC 20036, (202) 328-5150.* ◆

The Living Marsh

This section of the "Bulletin" features the varied plants and animals inhabiting or visiting the marsh ecosystem. As you will note in the following issues, the marsh is home or hunting ground for numerous organisms, many of which are totally dependent on wetlands for their existence.

Reed Grass (*Phragmites australis*)

Reed Grass is a tall, coarse grass with a terminal, feathery seed head and is often found as an invader of disturbed wetlands. It has very long (as long as 40 feet), exposed rhizomes and a characteristic seed head. It usually grows rapidly to 6 to 12 feet in height. Generally, the leaves have fallen by late fall or winter, but the naked stems and seed head remain until spring. Stem density ranges from 30 to 65 stems per square meter. Annual productivity ranges from 4 to 6 tons per acre per year. Managers are concerned about Reed Grass because of its ability to out- compete more desirable species such as Big Cordgrass (*Spartina cynosuroides*), Saltmeadow Hay (*Spartina patens*), Wild Rice (*Zizania aquatica*), and other native wetland species. It has some value to wildlife as cover and is a good erosion deterrent on disturbed sites. (For additional information, see VIMS Wetlands Program Technical Report 1.)

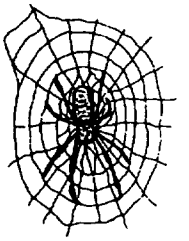


Virginia Rail
(*Rallus limicola*)

The Virginia Rail is a small reddish rail (9-11 inches) with a long slender curved bill and gray cheeks. The young in late summer are sooty black. The Virginia Rail is an elusive marsh bird found in northern freshwater and brackish marshes in the spring, summer, and fall and overwinters in Virginia salt marshes. It generally only flies a short distance before dropping out of sight into the marsh. It prefers to escape intruders by running through marsh vegetation. The rail's call is a series of descending grunts and a *Ticket-Ticket-Ticket-Ticket*. It's diet consists of insects, spiders, periwinkle snails, fiddler crabs, small fish, and the seeds of marsh plants.

Raccoon (*Procyon lotor*)

This common mammal is distinguished by it's bushy tail with brown or brownish-gray rings and black mask and is native only to the Americas. The Raccoon is nocturnal (active at night) and solitary except when breeding or caring for young. It's habitat varies but it prefers wooded streams and marshes. It's diet consists of practically all large insects, frogs, crayfish, grasshoppers, corn, acorns, fleshy fruits, and muskrats and rabbits if it can catch them.



Golden Silk Spider
(*Nephila clavipes*)

The Golden Silk Spider inhabits shaded woodlands and bottomland hardward swamps. The female is 7/8 to 1 inch and the male 1/8 inch. The female's cephalothorax (where the eyes and mouth are located) is pale gray with three black spots on each side. The legs are dark with brownish bands and tufts of black hair on the first and last pairs of legs. The abdomen is brownish green and irregularly spotted with white. The male is smaller with a more subdued body color.

The web is a strong slightly inclined orb with notchlike support lines and measures about 2 to 3 feet across. The Golden Silk Spider feeds on flying insects and during the day hangs head downward from the underside of the web near the center or hub. The web is repaired each day but never more than about half the web is replaced at a time.

American Shad
(*Alosa sapidissima*)

The American Shad is an elongate, strongly compressed fish with a dark blue or greenish back, pale sides, and silvery belly. It has a dusky spot behind the gill cover usually followed by several smaller spots. The top and bottom profiles are evenly rounded and the adults reach 30 inches in length.

The American Shad is an anadromous fish. Anadromous is the term used for fish that live in the ocean but return to the coastal rivers once a year to spawn. The spawning migration can begin as early as February in the southern Chesapeake Bay and continue to June in the northern part of the Bay. Pollution and dams have severely limited the shad's ability to reach adequate spawning sites. The Commonwealth has recently begun a program to remove dams and install fish ladders in an effort to open up some areas to the shad. Shad spawn at age four or five in tidal freshwater sections of the Bay. The female lays between 100,000 to 500,000 eggs per spawning season. The eggs remain suspended in the water and hatch in four to six days when the water temperature reaches the high 50's to low 60's°F.

Once the spawning activity is concluded, the adults return to the ocean and can be found feeding in the summer and fall as far north as Maine. The juveniles remain in the coastal waters during the summer and feed on plankton and insects. In fall the juveniles leave the coastal areas and begin their ocean migration north to Nova Scotia. It is believed that for the first few years juveniles may accompany adults on the seasonal north-south migration from Florida to Nova Scotia. ◆

In the General Assembly

House Bill 164 Patrons - Mary Marshall (48th District, legislative office 804-786-6894) and C. Richard Cranwell (14th District, legislative office 804-786-6891).

Transfer of development rights. The governing body of every county, city, or town may, as part of its zoning ordinance, provide for (i) the voluntary transfer of the development rights permitted on one parcel of land to another parcel of land, (ii) restricting or prohibiting further development of the parcel from which such rights are transferred, and (iii) increasing the density or intensity of development of the parcel to which such rights are transferred.

House Bill 742 Patron - Jay DeBoer (63rd District, legislative office 804- 786-7204).

This bill exempts *dredging and the disposal of dredged material from a congressionally authorized navigation channel* from the Wetlands Act and from obtaining a Virginia Water Protection Permit. *Editor's Note: Died in Committee.*

House Bill 834 Patrons - Harvey Morgan (98th District, legislative office 804-786-6607) and Robert Bloxom (100th District, legislative office 804-786-6596).

This bill will withdraw a certain area in the waters at the mouth of the Rappahannock River from Public Oyster Ground 1 so that Chesapeake Corporation can construct a mooring facility. *Editor's Note: Passed House, referred to Committee on Agr., Conservt. and Natural Resources.*

House Bill 908 Patrons - Robert Orrock Sr. (54th District, legislative office 804-786-7101), Harry Parrish (50th District, legislative office 804-786-7201), and Clinton Miller (28th District, legislative office 804-786-7298) and Senator John Chichester (28th District, legislative office 804-786-3441).

This bill would amend and reenact 10.1-2109 of the Code of Virginia, relating to designation of the Chesapeake Bay Preservation Areas. The amendment is as follows in italics:

10.1-2109. Local governments to designate Chesapeake Bay Preservation Areas; incorporate into local plans and ordinances.-A. Counties, cities and towns in Tidewater Virginia shall use the criteria development by the Board to determine the extent of the Chesapeake Bay Preservation Area within their jurisdictions. *Notwithstanding the Board's criteria, any county, city, or town may exclude from the Chesapeake Bay Preservation Area any land contiguous to (i) a shoreline of a lake or pond which lies partially within Tidewater Virginia, (ii) a bank of a river or stream where the opposite bank is outside of Tidewater Virginia, or (iii) a river or stream flowing from the locality to lands outside of Tidewater Virginia.* Editor's Note: Referred to Committee on Chesapeake and Its Tributaries.

Senate Bill 183 Patron - Senator Joseph Gartlan (36th District, legislative office 804-786-6691).

Restoration of habitat. Authorizes the Marine Resources Commission or local wetlands board to require the restoration of any site (wetlands, subaqueous bottoms, or coastal primary sand dunes) within their jurisdiction to predevelopment conditions if they determine that such restoration is necessary to recover lost resources or to prevent further damage to resources. The bill allows the Commission or local board to require scientific monitoring plans and financial security which it deems necessary to assure successful restoration is accomplished. The bill also provides that the Commission or local board may enforce restoration orders by injunction, mandamus or other appropriate remedy, and provides civil penalties up to $25,000 per day for violations of subaqueous bottom, wetland, or coastal primary sand dune laws, regulations or any notice, rule or permit condition of the Commission or board which relates thereto. These civil penalties may, in the discretion of the court assessing them, be paid into the treasury of the county, city or town in which the violation occurs for the purpose of abating environmental damage to, or the restoration of wetlands therein. With the consent of the violator, the Commission or local board may enter an order for payment by the violator of civil charges not to exceed $10,000 per violation, which are paid in lieu of civil penalties and which may be in addition to the cost of any restoration ordered by the Commission or local board. Finally, the bill authorizes the Commission to promulgate regulations pursuant to the Administrative Process Act which are necessary to carry out its powers and duties. *Editor's Note: Bill 183 has passed House and Senate unanimously and is awaiting Governor's signature.* ◆

Announcements

- The U.S. Environmental Protection Agency and the Virginia Institute of Marine Science are tentatively planning to host a symposium on marinas in the spring of 1990.
- The Middlesex Wetlands Board is considering a motion similar to the Gloucester County Wetlands Board which will require permanent benchmarks with tie down lengths on the plan view drawing in wetlands applications. In addition, site inspection prior to backfilling a structure is being considered. This action is being taken to better help the board determine wetlands permit compliance.

Wetlands Recipes

Arrowhead (*Sagittaria latifolia*)

Arrowhead is generally found in tidal freshwater marshes, inland marshes and swamps, and along the borders of streams, lakes, and ponds. It grows from six inches to four feet tall. The basal leaves are broadly to narrowly arrowhead shaped, and the three-petaled flowers are arranged in whorls of two to fifteen on a single stalk.

The tubers of *Sagittaria* were a common food of eastern indians. To collect them, follow the underground runners from the main plant out to the tubers which should be snipped off, washed, and cooked like potatoes.

This Issue's Quote

Winter: *"The Indians either boiled this root or roasted it in hot ashes. Some of the Swedes ate it with much relish at the time when the Indians were so near the coast; but at present none of them make any use of the roots. Nils Gustafson told me...the Indians, especially the women, travelled to some islands, at about Whitsuntide, dug out the roots, and brought them home; and while they had them they desired no other food. They were said to have been destroyed by hogs (brought over by the Europeans) which were exceedingly greedy for them. The cattle are fond of their leaves. I afterwards got some of these roots roasted, and in my opinion they tasted good, though they were rather dry. The taste was nearly the same as that of potatoes..."* (Peter Kalm, Swedish explorer, 1749, writing about Arrowhead).

Wetlands Program
The College of William and Mary
School of Marine Science
Virginia Institute of Marine Science
Gloucester Point, VA 23062

Wetlands Program